

Appl. No. 10/710,928
Amdt. dated March 15, 2005
Reply to Office action of December 15, 2004

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

5 Listing of Claims:

Claim 1 (currently amended): A lead type light emitting diode package comprising:

a light emitting diode device disposed in the lead type light emitting diode package; and

10 an encapsulating material covering the light emitting diode device, wherein a plurality of scatterer supported wavelength converter particles are distributed in the encapsulating material and each scatterer supported wavelength converter particle comprises one phase of scatterer and at least one phase of wavelength converting activator;

15 a molding material covering the light emitting diode device, a plurality of scatterer supported wavelength converters being included in the molding material;

wherein portions of light beams emitted from the light emitting diode device incident to each of the scatterer ~~scatter~~-supported wavelength converter particles are scattered by each of the scatterer ~~scatter~~-supported wavelength converter particles, and portions of light beams emitted from the light emitting diode device incident to each of the scatterer ~~scatter~~-supported wavelength converter particles are absorbed to excite each of the scatterer ~~scatter~~-supported wavelength converter particles to emit light in another wavelength, the lead type light emitting diode package thereby outputting light with improved brightness.

25

Claim 2 (currently amended): The lead type light emitting diode package of claim 1 wherein the ~~molding~~ encapsulating material comprises an organic molding compound, a ceramic material permeable to light, a glass material permeable to light, an insulation fluid material permeable to light, or a composite material comprising at

Appl. No. 10/710,928
Amdt. dated March 15, 2005
Reply to Office action of December 15, 2004

least two materials selected from a group consisting of the above-mentioned materials.

Claim 3 (currently amended): The lead type light emitting diode package of claim 1
5 wherein the scatterer and the wavelength converting activator have a physical or
chemical bonding to each other.

~~each of the scatter supported wavelength converters comprises a physical composite
material or a chemical composite material, and each of the scatter supported
wavelength converters comprises at least one scatterer and at least one activator.~~

10

Claim 4 (currently amended): The lead type light emitting diode package of claim 1 3
wherein the wavelength converting activator is a material represented by a general
formula $(A)_{3+t+u}(B)_{5+u+2v}(C)_{12+2t+3u+3v}:D$, where $0 < t < 5$, $0 < u < 15$, $0 < v < 9$, A is at least
one selected from Y, Ce, Tb, Gd, and Sc, B is at least one selected from Al, Ga, Tl, In,
15 and B, C is at least one selected from O, S, and Se, D is at least one selected from Ce
and Tb, and the scatterer comprises an oxide, a sulphuret, or a selenium compound of
at least one metal element selected from the above general formula.

Claim 5 (currently amended): The lead type light emitting diode package of claim 1 3
20 wherein the wavelength converting activator adheres to portions of a surface of the
scatterer.

Claim 6 (currently amended): The lead type light emitting diode package of claim 1 3
wherein the scatterer is encapsulated by the wavelength converting activator.

25

Claim 7 (currently amended): The lead type light emitting diode package of claim 1 3
wherein the wavelength converting activator is spread in the scatterer.

Claim 8 (canceled)

30

Claim 9 (original): The lead type light emitting diode package of claim 1 wherein the
light emitting diode device is adhered to a high reflectivity surface in the lead type

Appl. No. 10/710,928
Amdt. dated March 15, 2005
Reply to Office action of December 15, 2004

light emitting diode package by a non-conductive adhesive permeable to light.

5 Claim 10 (original): The lead type light emitting diode package of claim 1 further comprising a first lead used as a positive electrode and a second lead used as a negative electrode.

Claim 11 (original): The lead type light emitting diode package of claim 10 wherein one of the first lead and the second lead comprises a cup.

10

Claim 12 (currently amended): A chip type light emitting diode package comprising:

a casing comprising a recess;

a light emitting diode device disposed in the recess; and

an encapsulating material covering the light emitting diode device, wherein a

15

plurality of scatterer supported wavelength converter particles are distributed in the encapsulating material and each scatterer supported wavelength converter particle comprises one phase of scatterer and at least one phase of wavelength converting activator;

a molding material covering the light emitting diode device, a plurality of scatterer supported wavelength converters being included in the molding material;

20

wherein portions of light beams emitted from the light emitting diode device incident to each of the scatterer scatter-supported wavelength converter particles are scattered by each of the scatterer scatter-supported wavelength converter particles, and portions of light beams emitted from the light emitting diode device incident to each of the scatterer scatter-supported wavelength converter particles are absorbed to excite each of the scatterer scatter-supported wavelength converter particles to emit light in another wavelength, the chip type light emitting diode package thereby outputting light with improved brightness.

25

30

Claim 13 (currently amended): The chip type light emitting diode package of claim 12 wherein the molding-encapsulating material comprises an organic molding compound,

Appl. No. 10/710,928
Amdt. dated March 15, 2005
Reply to Office action of December 15, 2004

a ceramic material permeable to light, a glass material permeable to light, an insulation fluid material permeable to light, or a composite material comprising at least two materials selected from a group consisting of the above-mentioned materials.

5

Claim 14 (currently amended): The chip type light emitting diode package of claim 12 wherein the scatterer and the wavelength converting activator have a physical or chemical bonding to each other.

~~each of the scatter supported wavelength converters comprises a physical composite material or a chemical composite material, and each of the scatter supported wavelength converters comprises at least one scatterer and at least one activator.~~

10

Claim 15 (currently amended): The chip type light emitting diode package of claim 12 14 wherein the wavelength converting activator is a material represented by a general formula $(A)_{3+t+u}(B)_{5+u+2v}(C)_{12+2t+3u+3v}:D$, where $0 < t < 5$, $0 < u < 15$, $0 < v < 9$, A is at least one selected from Y, Ce, Tb, Gd, and Sc, B is at least one selected from Al, Ga, Tl, In, and Bi, C is at least one selected from O, S, and Se, D is at least one selected from Ce and Tb, and the scatterer comprises an oxide, a sulphuret, or a selenium compound of at least one metal element selected from the above general formula.

20

Claim 16 (currently amended): The chip type light emitting diode package of claim 12 14 wherein the wavelength converting activator adheres to portions of a surface of the scatterer.

25

Claim 17 (currently amended): The chip type light emitting diode package of claim 12 14 wherein the scatterer is encapsulated by the wavelength converting activator.

Claim 18 (currently amended): The chip type light emitting diode package of claim 12 14 wherein the wavelength converting activator is spread in the scatterer.

30

Claim 19 (canceled)

Appl. No. 10/710,928
Amdt. dated March 15, 2005
Reply to Office action of December 15, 2004

Claim 20 (original): The chip type light emitting diode package of claim 12 wherein the light emitting diode device is adhered to a high reflectivity surface in the chip type light emitting diode package by a non-conductive adhesive permeable to light.

5

Claim 21 (original): The chip type light emitting diode package of claim 12 further comprising a positive electrode and a negative electrode in the case.